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USSN: 09/771,692

REMARKS

In view of the above amendments and the following remarks, the Examiner is respectfully requested to withdraw the rejections and allow Claims 1-14 and 35-43.

Claims 27-34 have been withdrawn from consideration.

Claims 35 and 36 have been amended to specify that the striking improves pulse jet firing reliability relative to pulse jet firing reliability absent the striking. Support for this amendment may be found in the specification, e.g., page 3, lines 28-30.

The undersigned thanks the Examiner for the helpful telephonic interview held on December 18, 2003. During the interview, the Kutami et al. reference was discussed. Specifically the external pressure applying mechanism of the device of Kutami et al. was explained to be a substitute for an internal ejector such as the thermal resistor element shown in the prior art device of FIGS. 3A-3E. As such, it was shown that there is no motivation by Kutami et al. to have both an ejector in the chamber and an external pressure applying mechanism in the same device. The Examiner agreed that there is no motivation to modify the Kutami et al. device to include an internal ejector because the pressure applying mechanism is a substitute for an internal ejector. The Examiner indicated that the rejections would be withdrawn in view of this discussion and that case would be in form for allowance.

As no new matter has been added by the above amendments, the Applicant respectfully requests the entry thereof.

ELECTION/RESTRICTION

The Examiner has withdrawn from consideration Claims 27-34 as being directed to an invention that is independent or distinct from the invention originally claimed. The Examiner states that since the Applicant has received an action on the merits for the originally presented invention, the originally presented invention has been constructively elected.

As stated in the MPEP §803, if search and examination of an entire application can be made without serious burden, the examiner must examine it on the merits, even though it includes claims to independent or distinct inventions. It is Applicant's position that it would not be unduly burdensome to perform a search on Claims 1-14 and 27-43 together for at least the reason that all of these claims

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include dispensing drops from a pulse jet and striking the pulse jet. Accordingly, the Applicant traverses the restriction requirement.

REJECTION UNDER 35 U.S.C. §112, SECOND PARAGRAPH

Claims 35-36 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the Examiner asserts that these claims are indefinite because the term "improves pulse jet firing reliability" is a relative term and the term "improves" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree and one of skill in the art would not be reasonably apprised of the scope of the invention.

Claims 35 and 36 have been amended to specify that the term is relative to pulse jet firing reliability absent the striking, i.e., relative to an analogous method wherein striking of the pulse jet does not occur. The Applicant respectfully submits that the specification provides a standard for ascertaining the requisite degree and one of skill in the art would be reasonably apprised of the scope of the invention. In this regard, the Applicant points to the Summary of the Invention at page 3. Specifically, at page 3, lines 28-30 it is taught that "While the striking of the pulse jet is believed to dislodge bubbles to improve pulse jet firing reliability, the present invention is not limited to such a requirement." Accordingly, at least these teachings indicate a standard for ascertaining the term "improves" as this passage makes clear that striking a pulse jet improves pulse jet firing reliability as compared to pulse jet firing that does not include striking of the pulse jet.

Accordingly, the Applicant respectfully submits that Claims 35 and 36 are definite. As such, the Applicant respectfully requests that this rejection be withdrawn.

REJECTION UNDER 35 U.S.C. §103

Claims 1-12, 27-30 and 35-40 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Kutami et al. (US 6,132,035).

The M.P.E.P. provides clear guidance on the requirements of a *prima facie* case of obviousness:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must

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be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations."
M.P.E.P. § 2142. (Emphasis added.)

Thus, the cited reference must teach or suggest all of the limitations of the claimed invention for the claimed invention to be rendered obvious over the reference. Independent Claims 1 and 11, and the claims that depend therefrom, specify a method that includes dispensing drops from a pulse jet and striking the pulse jet at least once wherein the pulse jet that includes a thermoelectric or piezoelectric ejector in the chamber of the pulse jet. However, the cited reference fails to teach or suggest such a pulse jet and in fact teaches away from a pulse jet having a thermoelectric or piezoelectric ejector in the chamber of the pulse jet. As noted above, during the telephonic interview conducted on December 18, 2003, the Examiner agreed that there is no motivation to modify the Kutami et al. device to include an internal ejector because the pressure applying mechanism is a substitute for an internal ejector and as such there is no motivation to have both an ejector in the chamber and an external pressure applying mechanism.

Kutami et al. teach an ink jet printing head that includes a pressure chamber, vibration plate and a force applying mechanism. In use, the force applying mechanism applies a force to the vibration plate to provide vibration to increase the pressure in the pressure chamber to eject ink from the nozzle of the chamber (see e.g., abstract). However, as acknowledged by the Examiner, Kutami et al. do not teach a thermoelectric or a piezoelectric ejector in the chamber, but rather teach a force applying mechanism separate from the chamber.

The Examiner points to Figs. 3A-3E of Kutami et al. which illustrate a conventional ink jet printing head having a thermal resistor element 7 positioned in the vicinity of a nozzle 6 as the pressure generating means. Kutami et al. details the disadvantages of these conventional devices such as (1) dust adhering to the nozzle, (2) bubbles entering from the nozzle, and (3) nozzles becoming blocked by dried ink. Kutami et al. further explain that conventional devices that include a pressure generating means formed on the nozzle and the pressure chamber suffer from the above-described disadvantages as well as high cost for such disposable embodiments:

Recently, a disposable head integrally having a printing head and an ink head in the form of a head cartridge has been developed, and the entire head cartridge is replaced when all of the ink within the tank is consumed. However, according to such a printing head, the pressure generating means is disposed of at the same time, and there are problems in that the cost of the head is high and the running

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(i.e., operating) cost is high.

In making this rejection, the Examiner asserts that it would be obvious to modify the invention of Kutami et al. by including an ejector in the chamber if one were not concerned with discarding the piezoelectric element.

As noted in the Applicant's previous communication, there is no motivation or suggestion in the cited reference or any art of record to modify the invention of Kutami et al. as suggested by the Examiner (i.e., to include an ejector of any kind in the chamber of the Kutami et al. device) as ink is expelled from the invention of Kutami et al. in an entirely different manner. Furthermore, there is no reason why the device of Kutami et al. would even need an additional mechanism, in addition to an external striker, when Kutami et al. teach that employing an external striker serves to expel the ink from the nozzle of the chamber. In fact, a stated motivation for the invention of Kutami et al. is to reduce the cost of the head (see col. 2, lines 4-8: "...there are problems in that the cost of the head is high..."). Accordingly, not only does the device of Kutami et al. not require (1) an external pressure applying mechanism, and (2) an ejector in the chamber, but to add an ejector in the chamber would increase the cost of the device, which is in direct opposition to one of the stated motivations (i.e., to decrease cost) of the external pressure applying-device of Kutami et al.

Furthermore, as described in Applicant's previous communication, Kutami et al. teach away from making the combination suggested by the Examiner as Kutami et al. explain the disadvantages of such a configuration. In this regard, the Applicant respectfully directs the Examiner's attention to col. 1, lines 14-col. 2, line 8 of the cited reference which describes devices with piezoelectric or thermoelectric ejectors in the chamber and explains the disadvantages of such devices (e.g. the whole head, including the piezoelectric or thermoelectric ejectors must be disposed -- see for example, column 2, lines 64-67). Kutami et al. then explains (column 2, lines 11-13) that their invention is intended to overcome the problems of the foregoing prior art devices. Given this teaching, one of ordinary skill is actually led away from then trying to place a conventional piezoelectric or thermoelectric ejector back into Kutami et al.'s device (particularly when, as pointed out above, there is no need for adding such an ejector). The Examiner asserts that one would be motivated to modify the Kutami et al. device in such a manner if one were not concerned with discarding the piezoelectric element along with the chamber. However, as Kutami et al. explain, this very same concern is one of the motivations for having the pressure applying means exterior to the chamber.

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As noted in the MPEP at section 2141.02: "A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984)." Furthermore, the MPEP at section 2145 (X)(D), states that in addition to the requirement that prior art must be considered in its entirety, including disclosures that teach away from the claims, the MPEP further states that proposed modifications cannot change the principle of operation of a reference. However, as described above, the principle of operation of the device of Kutami et al. concerns striking an external wall of a chamber with a pressure applying mechanism to displace the wall and eject ink from the chamber. To modify the device of Kutami et al. to include an additional component within the chamber to eject ink from the chamber would not only increase the cost of the device as note above, but would also change the principle of operation of the device from one that employs an external striking mechanism to eject ink from a chamber to one that employs a bubble generating mechanism- a principle of operation the patentees specifically describe as disadvantageous.

Furthermore, the Applicant respectfully submits that the cited reference fails to teach or suggest all the elements of Claims 37 and 39. Specifically, Claims 37 and 39 specify that the pulse jet includes a rigid chamber. However, the Applicant respectfully submits that a rigid pulse jet chamber is not taught or suggested in Kutami et al.

In making this rejection, the Examiner merely asserts that the pressure chamber of Kutami et al. is a rigid chamber ("Kutami et al. disclose a method of employing an ink jet printing head includes a pressure chamber (rigid chamber)..."). However, the Examiner does not point to any disclosure of Kutami et al. of a rigid chamber, nor is there any such disclosure or suggestion in Kutami et al. or in any other art of record that the chamber of Kutami et al. is rigid. In fact, the chamber of Kutami et al. is a flexible chamber. Specifically in this regard, in describing the operation of the device, Kutami et al. explicitly teach "Hence, the displacement transmitting part 14 moves a predetermined quantity to the left as shown in FIG. 4B, and displaces the outer wall 11a by pushing on the outer wall 11a. As a result, pressure is applied to the ink within the pressure chamber 11, and ink particles, i.e., droplets, 17a are ejected from the nozzle 13." (FIG. 4 and col. 5, lines 52-58 - emphasis added) Accordingly, the chamber of the device of Kutami et al. is not rigid as claimed in the subject claims, but rather is one that is flexible and able to be bent inwardly (see for example FIG. 4B, and col. 10, lines 58-67 (emphasis added) corresponding to the embodiment of FIG. 20: "When a voltage is applied to the driving part 15,

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the displacement transmitting part 14 is displaced in the longitudinal direction as shown in FIG. 21 and presses the outer wall 11a. Hence, the outer wall 11a is bent towards the inside...")

Accordingly, for at least the reasons described above, a proper *prima facie* case of obviousness cannot be made. As such, the Applicant respectfully requests that the rejection of Claims 1-12, 27-30 and 35-40 be withdrawn.

Claims 13-14 and 41-42 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Kutami et al. (US 6,132,035) in view of Wiktor (US 6,232,129).

Claims 13 and 14 depend from Claim 11 and thus specify a pulse jet that includes a chamber having a thermoelectric or piezoelectric ejector in the chamber. As described above, Kutami et al. not only fail to teach or suggest such a structure. As noted above, during the telephonic interview conducted on December 18, 2003, the Examiner agreed that there is no motivation to modify the Kutami et al. device to include an internal ejector because the pressure applying mechanism is a substitute for an internal ejector and as such there is no motivation to have both an ejector in the chamber and an external pressure applying mechanism.

In making this rejection, the Examiner acknowledges that Kutami et al. does not disclose that the device is employed for arraying DNA, for which the Examiner relies on Wiktor. Wiktor teaches a piezoelectric pipette that includes a glass capillary 14 having piezoelectric activating element 12 positioned on the exterior thereof. However, Wiktor does not teach or suggest the structure as claimed and, as such, for at least this reason fails to make up for the deficiencies of Kutami et al.

Claims 41 and 42 depend from Claim 39 and thus specify a rigid chamber. As noted above, the device of Kutami et al. requires a flexible chamber so that the displacement transmitting part can displace the outer wall thereof by pushing on the outer wall. Accordingly, even if one were to disregard the whole teachings of Wiktor and selectively pick and choose components thereof such as the glass capillary, there would be no motivation to modify the chamber of Kutami et al. to include a glass capillary as taught by Wiktor as such would render the chamber inoperable for its intended use as the chamber of Kutami et al. needs to be able to be displaced by pushing thereon.

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CONCLUSION

In view of the remarks, this application is considered to be in good and proper form for allowance and the Examiner is respectfully requested to pass this application to issue.

The Commissioner is hereby authorized to charge any fees under 37 C.F.R. §§1.16 and 1.17 which may be required by this paper, or to credit any overpayment, to Deposit Account No. 50-1078, reference no. 10003512-1.

Respectfully submitted,
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